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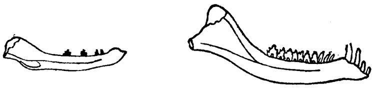
OBSERVATIONS UPON THE UPPER TRIASSIC MAMMALS, DROMATHERIUM AND MICROCONODON.

BY HENRY F. OSBORN, SC. D.

In 1857 Prof. Emmons [1] described portions of three small mammalian jaws from the Upper Triassic (Chatham Coal Fields) of North Carolina, which he assigned to the new genus *Dromatherium.* The type-specimen is now in the Geological Museum of Williams College. Another specimen is in the collection of the Academy of Natural Sciences of Philadelphia. I cannot ascertain the whereabouts of the third fragmentary specimen mentioned by the author. I am indebted to Prof. Samuel F. Clarke, of Williams College, for an opportunity of studying the type specimen. Although slightly injured in the original removal of the matrix, this fossil is in beautiful preservation, and gives the complete mandibular dentition, with the exception of two molar crowns. I soon observed that my drawing, made under a camera, did not agree with that given by Emmons, in his American Geology, Part VI, p. 94, which has since been copied by Owen, Dana and others. This discrepancy was apparently explained later by a comparison of the Williams College specimen with that in the Academy of Natural Sciences of Philadelphia. In the latter, although the mandible is nearly complete, two molars and two premolars only are preserved, but these indicate a distinct genus. As Emmons referred both jaws to the same genus, it is not unlikely that he supplemented the rather obscure characters of the teeth in his type-specimen with the very obvious tooth patterns of the less perfect specimen. Thus, while the number of the molars in Emmons' drawing follows the type-specimen, their form resembles that observed in the Microconodon molars, which will presently be described.



Microconodon and *Dromatherium.* Natural size.

Those familiar with the works of Professors Owen and Marsh upon the Mesozoic mammalia are aware that sharp distinctions in the molar series of the mammals of this period do not exist. That is, the only distinction drawn between molars and premolars is one of form; we have no data as to permanent and deciduous dentition, except possibly in the genus *Triconodon.* The rule adopted is that, where the post-canine teeth are not all alike, the series of like form following the canine are called premolars; and those behind these, of another form, are called molars. This rule has been applied to all genera, excepting *Phascolotherium* and *Diplocynodon*, where all the post-canine teeth are practically alike.

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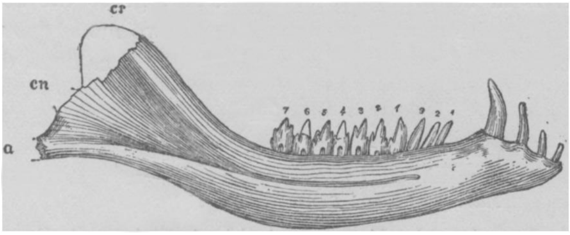
[1] American Geology, Part VI, pp. 93 and 94.

DROMATHERIUM.

Dromatherium sylvestre Emmons.

Generic Characters.—Incisors and canines erect. Molars and premolars unlike. Molar-premolar series compact, leaving a wide diastema between the canine and first premolar. Premolars high, styloid and procumbent, with no cingulum and probably single fanged. Molars bifanged with high pointed crowns and minute sometimes bifid cusps on the anterior slope and distinct pointed cusps on the posterior slopes. The dental formula is



Dromatherium sylvestre Em. Magnified.

$$\mathrm{I.}\,\frac{-}{3}\qquad \mathrm{C.}\,\frac{-}{1}\qquad \mathrm{Pm.}\,\frac{-}{3}\qquad \mathrm{M.}\,\frac{-}{7}$$

The incisors are nearly erect, and are separated by interspaces equaling the diameter of their crowns, which indicates that the superior incisors interlocked with them. I_1 is low and small; I_2 is larger and more erect; I_3 is very high, slender and slightly recurved, resembling the canine. The canine is tall, stout and recurved, and in form is similar to the canine of *Peralestes.* There is no indication of a double fang. A wide diastema separates this tooth from the premolars. These teeth are styloid in shape, and strongly procumbent. The two anterior are apparently supported on single fangs. The crowns are subcylindrical, with obtuse tips. The third premolar is larger, more tapering from base to summit, and has an indication of a double fang. The first molar in general outline is transitional between the molars and premolars. On the anterior slope of the main cone, near the summit, is a fine accessory cusp; while near the base of the posterior slope is a more distinct cusp. The second molar has two accessory cusps on the anterior slope of the main cone, and one on the posterior slope placed half way down. The third molar differs from the others in the large size of the posterior cusp. On the anterior slope there is an indication of a small accessory cusp. In the fourth molar the crown tip is detached, but there is an indication of the usual anterior and posterior accessory cusps. The fifth molar, besides the anterior and posterior cusps, has the trace of a posterior cingulum and possibly of a postero-external cusp. The sixth molar is like the fourth. The seventh molar is the most complex tooth in the series; like the second, it has two accessory cusps on the anterior slope of the main cone, the uppermost of which is distinctly bifid. The posterior slope also has a bifid accessory cusp, and a faint basal cingulum. The anterior cusps throughout rise like needle-points on the sides of the teeth; the posterior cusps are more distinct. All the molars are compactly placed with high, rather narrow crowns, and deep depressions above the double fangs. The characters of these crowns were made out with the greatest difficulty, and a more perfect specimen may show slight difference of detail.

The mandible of *Dromatherium* is heavy and well-rounded in section. It is marked on its inner face by a deep mylohyoid groove, widening posteriorly into a broad pterygoid fossa. The upper border rises behind the molars into the coronoid process, *cr*. The summit of this process is broken, but a faint impression on the matrix shows that it had a high, slightly recurved outline. A small portion of the hind border seems to be preserved just above the angle which would indicate that the condyle, *cn*, was placed midway between the coronoid and angle, somewhat as in *Amblotherium*. The thick lower border has a gentle double curvature. There is no trace of the symphysial surface.

The unique character of the dentition separates *Dromatherium* widely from any known fossil or recent genus.

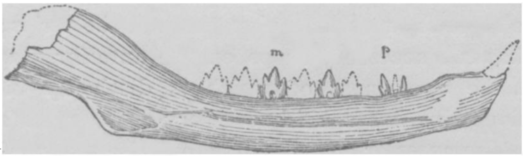
MICROCONODON.

Microconodon tenuirostris, gen. et sp. nov.

This genus is founded upon the specimen in the collection of the Academy of Natural Sciences of Philadelphia, which was described by Emmons as *Dromatherium.*

Generic Characters.—A wide diastema between the canine and first premolar. Molars and premolars unlike. Premolars simple, erect cones with a faint posterior cingulum and partly bi-fanged. Molars bi-fanged with broad crowns supporting a large median cusp, at the sides of which are anterior and posterior conical cusps, sub-equal in size, and a distinct posterior cingulum.

The ramus is about two-thirds the length of that of *Dromatherium.* Its general lower curvature is single. There is a depression extending beneath the molar-premolar series, but this is shallower than the mylohyoid groove, and I infer that the outer surface of the jaw is the one exposed. The coronoid rises by a gentle curvature above the molars and the fractured portion seems to have left a faint impression on the matrix, which indicates a low rounded contour. The posterior half of the lower border is marked by a downward process, somewhat similar to that in *Peramus.* The surface of the process bears a shallow fossa. Above this the crotaphyte fossa is faintly marked. The symphysial portion of the jaw is partly fractured. The matrix bears an impression which may have been left by a tooth, but more probably is accidental. Altogether, the delicate character of this ramus indicates an animal of feebler masticating power than *Dromatherium.*



Microconodon tenuirostris Osb. Magnified.

The molars probably extended backward to the rise of the upper border. If so, the molar-premolar series covered a greater proportional space than those of *Dromatherium.* This arose from the comparatively broader crowns of the molars. By analogy with several other Mesozoic genera, we may suppose that the foremost molar preserved is the second, and that behind the hindermost were two other molars. This would give four premolars and six molars. Or there may have been three premolars and seven molars as in *Dromatherium.* Unfortunately no casts are preserved to settle this point, and the restoration of the missing teeth is purely conjectural.

The molars are somewhat like those of *Amphitherium* except that the crowns are higher and the anterior and posterior cusps arise from the sides of the main cusp instead of from the base of the crown. The posterior basal cusp which may be the continuation of an internal cingulum is well marked, as is the depression between the two fangs. The third premolar is much larger than the first, and has an indication of two fangs. There is a trace of the fang of the intermediate premolar. These teeth, unlike those of *Dromatherium*, are erect and do not rise to the level of the molar crowns. The simple premolars differentiate the genus from *Amphitherium.*

PRINCETON, N. J., *December* 20*th.*